

## **A new littoral *Elachista* species, *E. kobomugi* sp. nov., and its close relatives (Lepidoptera, Elachistidae) from Japan**

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**Abstract** A new littoral elachistid micromoth, *Elachista kobomugi*, is described from Japan, with biological information, and three species closely related to it, *E. utonella* Frey, *E. bipunctella* (Sinev and Sruoga) and *E. albidella* Nylander, are newly recorded from Japan. A key is given to the males of these four species. All these species belong to one of the smaller natural groups within the *E. tetragonella* group *sensu* Kaila (1996). A taxonomic note on the *E. tetragonella* group is given.

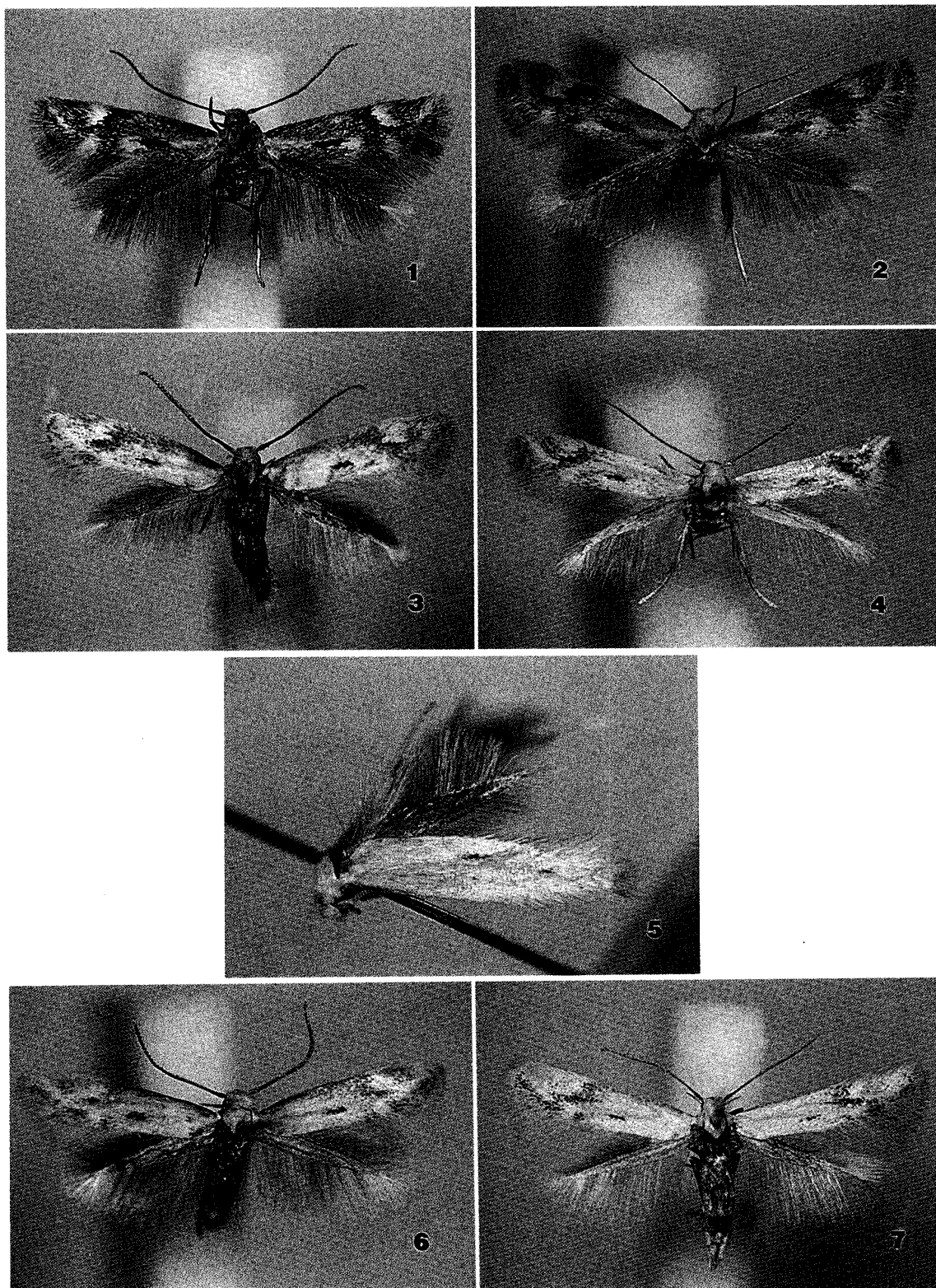
**Key words** *Elachista kobomugi* sp. nov., *Elachista tetragonella* group, Elachistidae, new record, Japan.

The elachistid fauna of the Far East Continent had been little known until about 10 years ago, but recently it has been vigorously investigated by Sinev (1991, 1992), Sruoga (1995), Sinev and Sruoga (1995) and Kaila (1998, 1999). Sinev and Sruoga (1997) mentioned in a key 47 species as occurring in the Russian Far East. In Japan, Kuroko (1982) and Parenti (1983) recorded a total of 15 species on the basis of material mainly from the central, western, and southern parts of the country.

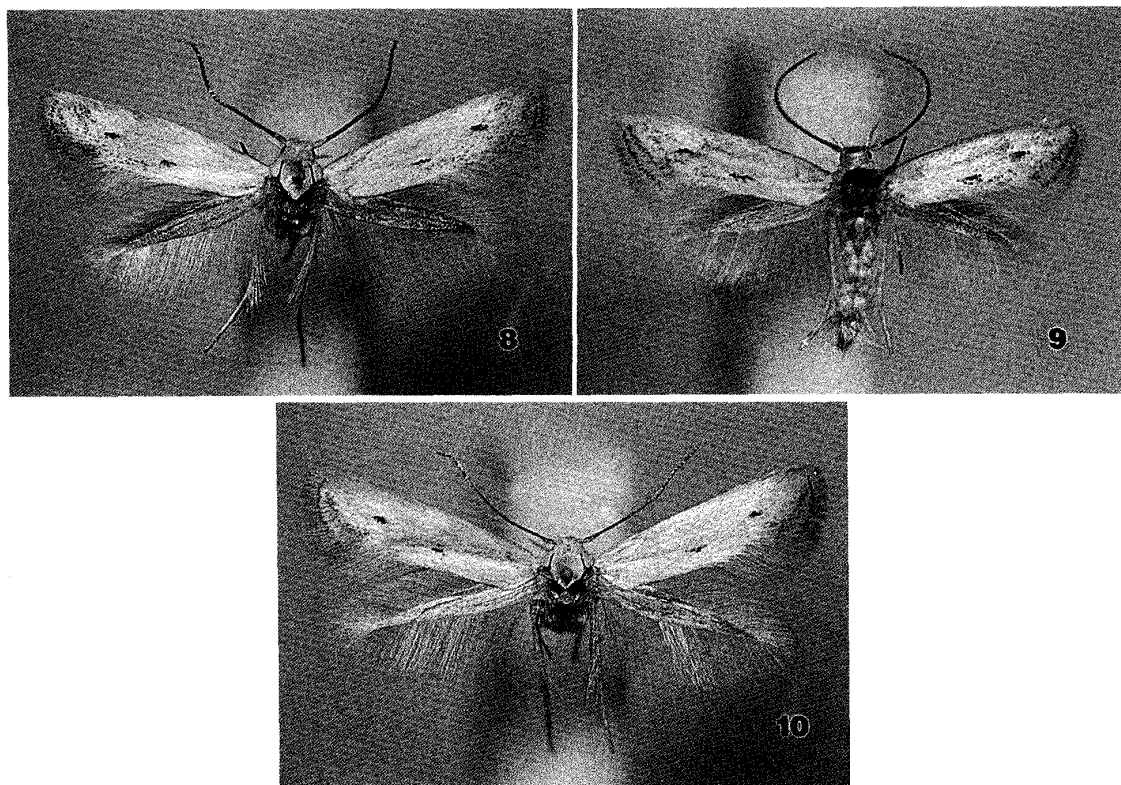
However, the fauna of northern Japan has remained essentially unknown. I have been engaged in collecting material mainly in northern Japan in recent years, and a good collection is now at hand. In this paper, a new littoral species is described and three species are recorded as new to Japan out of the collection. All these species belong to one of the smaller natural groups within the *Elachista tetragonella* group *sensu* Kaila (1996).

### **Taxonomic note on the *Elachista tetragonella* group *sensu* Kaila (1996)**

Traugott-Olsen and Nielsen (1977) proposed the *Elachista tetragonella* group within the genus *Elachista* on the basis of certain characters. The same authors proposed the genus *Biselachista* as well for a group of *Elachista* species sharing a divided gnathos and three other derived characters. Kaila (1996) concluded that the limits of the *tetragonella* group should be expanded to include the *Biselachista* members, because all the diagnostic characters of *Biselachista* except for the divided gnathos occur in various combinations among the species of the *E. tetragonella* group *sensu* Traugott-Olsen and Nielsen, because the species referable to *Biselachista* on the basis of the shape of the gnathos do not always have any of the diagnostic characters of *Biselachista*, and because *E. leucosticta* Braun has all the diagnostic characters of *Biselachista* except for the gnathos being divided basally and fused distally. He redefined the *tetragonella* group as sharing the following characters: the basal costal fold of the valva occupies 1/3–1/2 of valval length; the distal costal fold of the valva forms a free lobe; the cucullus is rounded; the uncus lobes are ventrally covered with short, thick, often clavate setae; the median plate of the juxta is not differentiated; the aedeagus contains a



Figs 1-7. *Elachista* spp., adult. 1. *E. utonella* Frey, ♂, dark form (Sakkuru, Otoineppu-mura). 2. *Ditto*, ♀, dark form (Sakkuru, Otoineppu-mura). 3. *Ditto*, ♂, extremely whitened individual (Higasi-sarobetu, Toyotomi-tyo). 4. *Ditto*, ♀, extremely whitened individual (Higasi-sarobetu, Toyotomi-tyo). 5. *E. bipunctella* (Sinev & Sruoga), ♂ (Tokisatamappu, Tomakomai-si). 6. *E. albidella* Nylander, ♂ (Ose-yati, Minamihakkoda). 7. *Ditto*, ♀ (Ose-yati, Minamihakkoda).



Figs 8–10. *Elachista kobomugi* sp. nov., adult. 8. ♂, holotype (Tottori-sakyu, Tottori-si). 9. ♂, paratype (Odanozawa, Higasidori-mura). 10. ♀, paratype (Tottori-sakyu, Tottori-si).

longitudinal sclerotization in the vesica (there are some exceptions); the antrum is differentiated, bowl-shaped; the colliculum is shortly sclerotized posteriorly, leaving a short membranous zone between the sclerotization and antrum.

The *E. tetragonella* group can be separated into some smaller natural groups of very closely related species. All the four species occurring in this paper belong to one such group, which is defined by the following characters: the forewing has a whitish costal spot on basal 3/4 rather than 2/3; in the male genitalia, the uncus lobes are shorter than one and a half times the width and have setae on the greater part of the ventral surface, and the gnathos is distally divided into a pair of small spinose knobs and has short arms; in the female genitalia, the small signum has a single transverse dentate ridge, which is sometimes reduced considerably and almost interrupted medially.

### *Elachista utonella* Frey (Figs 1–4, 11, 12)

*Elachista utonella* Frey, 1856, *Tineen und Pteropheren Schweiz*: 300; Parenti, 1996, *Lepid. Europe. Distrib. Checklist*: 73; Kaila, 1999, *Syst. Ent.* **24**: 169.

*Biselachista utonella* (Frey, 1856): Traugott-Olsen and Nielsen, 1977, *Fauna entomologica scand.* **6**: 266 (see Remarks); Traugott-Olsen, 1994, *SHILAP (Revta Lepid.)* **88**: 326; Sruoga, 1995, *Phegea* **23**: 161; Sinev and Sruoga, 1997, in Ler, *Key Insects Russian Far East* **5** (1): 500.

*Elachista caricis* Stainton, 1858, *Entomologist's Ann.* **1859**: 155.

*Elachista paludum* Frey, 1859, *Linn. ent.* **13**: 283.

*Elachista palustrella* Morris, 1870, *Nat. Hist. Br. Moths* **4**: 225.

*Elachista carinisella* Morris, 1870, *Nat. Hist. Br. Moths* **4**: 225.

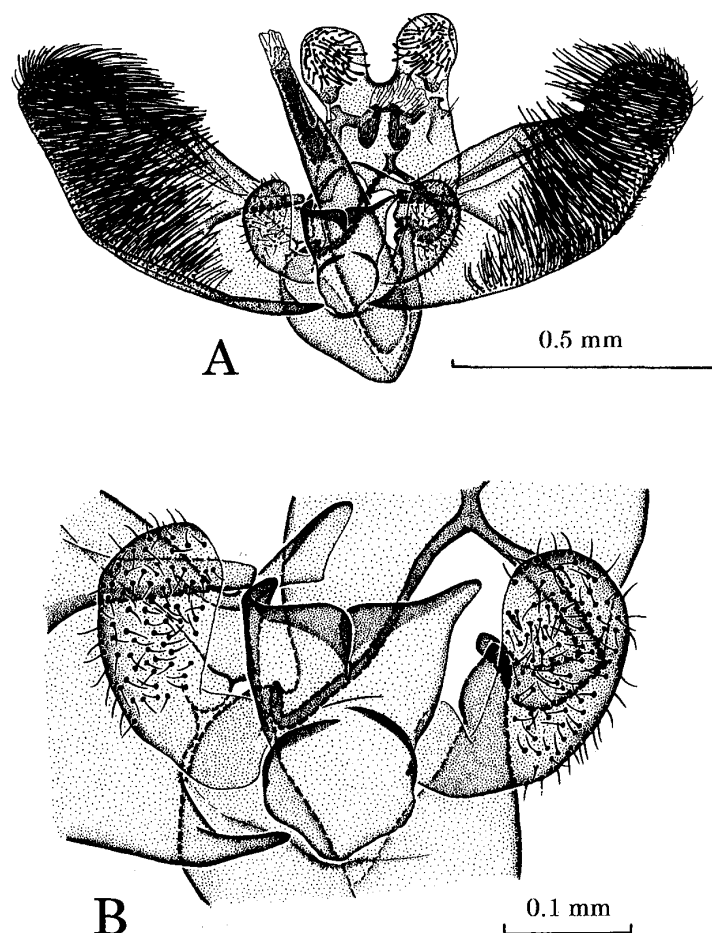


Fig. 11. Male genitalia of *Elachista utonella* Frey. A: caudal view, with valva expanded, B: juxta and digitate process (slide no. 0161, K. Sugisima).

**Redescription.** Male (Figs 1, 3) and female (Figs 2, 4). Forewing length ♂ 3.3–4.2 mm, ♀ 3.4–4.5 mm; wing expanse ♂ 7.3–9.3 mm, ♀ 7.6–10.0 mm.

Head creamy white to brown and sometimes tinged with grey in male, varying from white to beige but not brown in female; neck tufts often darker than frontoclypeus. Scape creamy white or beige, dark brownish above. Flagellum dark brownish, slightly raised in distal part in male. Labial palpus creamy or beige, below with a dark brownish streak sometimes extending into the third segment. Thorax and tegulae creamy, beige, or greyish brown in male, varying from white to beige but not brown in female. Fore and mid legs greyish brown. Hind tibia and tarsus usually dark greyish above and ochreous below, but sometimes uniformly ochreous. Abdomen greyish or dark greyish, seldom ochreous grey in male, but sometimes pale ochreous in female; anal tuft paler.

Forewing dark greyish, brownish, or sometimes considerably whitened, darkened on basal 2/3 of costa and often on dorsum as well, and suffused with coppery brown scales especially on distal 1/2; beyond basal 2/5 of costa a group of paler scales sometimes vaguely recognizable; just before basal 3/4 of costa a whitish spot inwards bordered with a triangular blackish brown mark, which is sometimes reduced to a few blackish dots; around the apex a whitish streak tapering almost along termen; around the middle of the fold an elongate blackish brown mark bordered outwards with a whitish spot and inwards with a whitish streak tapering towards the base along the fold and often blurred; on tornal area a whitish spot

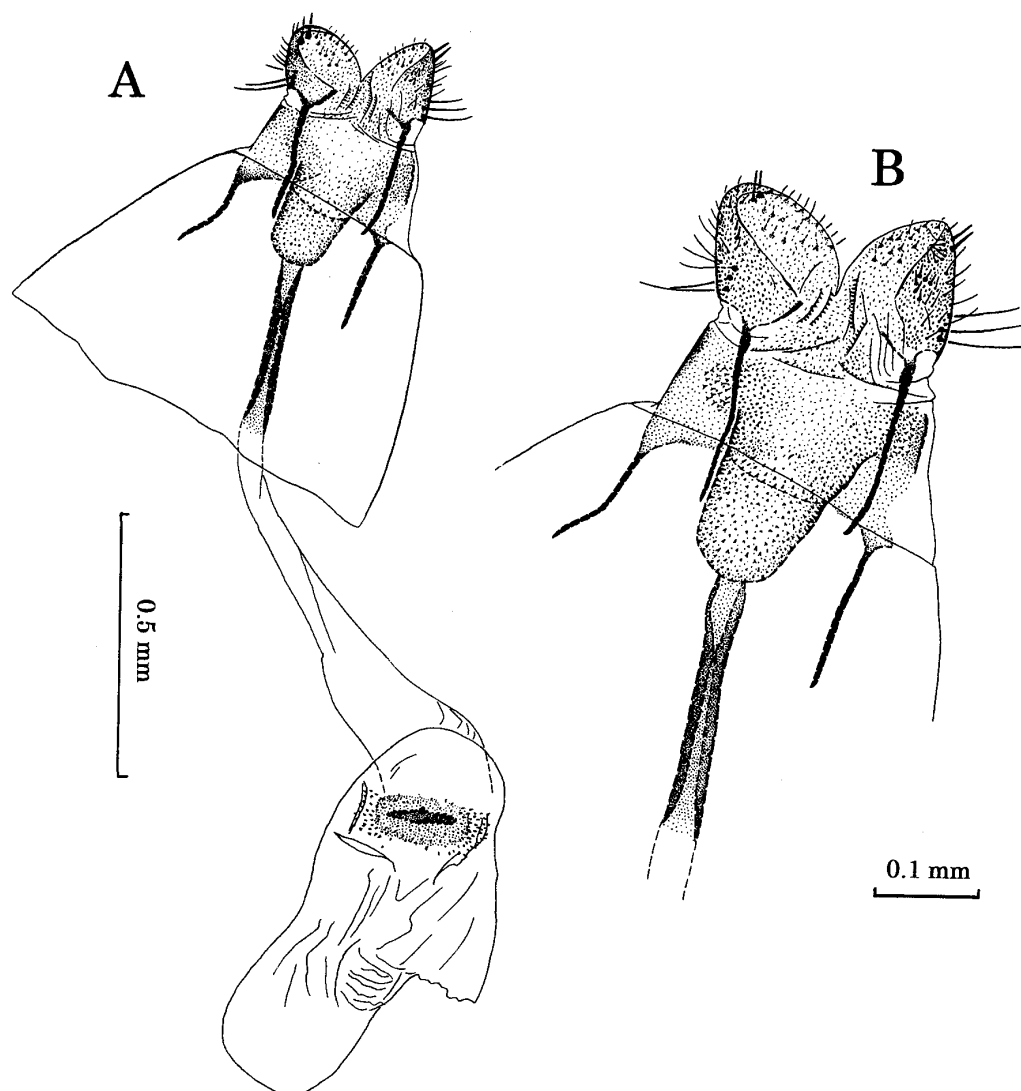


Fig. 12. Female genitalia of *Elachista utonella* Frey. A: ventral view, B: caudal part (slide no. 0162, K. Sugisima).

almost opposite to the costal one; cilia greyish on greater part and pale ochreous around the whitish markings mentioned above, but uniformly ochreous in some whitened specimens; cilia line blackish brown. Hind wing dark or ochreous grey; cilia greyish, often ochreous around apex of the wing.

Male genitalia (Fig. 11). Uncus lobe round, with 23–45 spatulate setae; indentation between the lobes deep, U-shaped, and strongly sclerotized in cephalic part. Tegumen a little longer than wide, slightly narrowing towards the uncus. Gnathos distally divided into a pair of small knobs; arms short. Valva wide ( $1/3$  of the valva length) and almost parallel-sided in basal  $3/5$ , tapering in distal part because of the obtuse bend in the ventral margin (over  $145^\circ$ ); cucullus round, occupying apical  $1/6$  of valva. Digitate process thick, clavate, with short setae scattered. Juxta lobes separated from each other by a very narrow cleavage, trapezoidal, with the outer corner produced; outer margin often strongly sclerotized; setae absent. Vinculum moderately sclerotized. Aedeagus tapering distally, shorter than valva, with cornutus represented by an elongate sclerotized plate  $1/3$  as long as aedeagus.

Female genitalia (Fig. 12). Papilla analis bluntly triangular in lateral view, apically with two stout bristles, and basally with two distinctly longer setae; some setae on the ventral side thicker than the others. Apophyses slender, 1–1.6 times as long as papilla analis; anterioris never longer than posterioris. Antrum bowl-shaped, usually as long as but sometimes distinctly shorter than papilla analis. Colliculum as long as or slightly longer than one and a half times the length of antrum, separated from antrum by a short membranous part. Ductus seminalis branching off just cephalically to colliculum. Signum represented by a small sclerotized patch with a transverse dentate ridge, which has less than ten teeth in each end and is sometimes reduced considerably.

Distribution. Probably throughout the Palaearctic region: Europe to Japan (Hokkaidô). The species is commonly known from almost all parts of Europe (*e. g.* Traugott-Olsen and Nielsen, 1977), and was recently recorded from the Russian Far East (Sruoga, 1995).

Foodplants. Many species of Cyperaceae, *Carex dimorpholepis* Steud., *C. dispalata* Boott, *C. lyngbyei* Hornem., *C. pumila* Thunb., *C. rhynchophylla* C. A. Mey., *C. sadoensis* Franch., *C. thunbergii* Steud., *Scirpus wichurae* Bocklr., and some unidentified species of *Carex*, are recorded as the foodplants in Japan. Besides these cyperaceous plants, *Juncus gerardi* Loisel. (Juncaceae) and *Festuca* sp. (Poaceae) are recorded in Europe (Parenti and Varalda, 1994).

Biology. Larval feeding has been observed only from spring to mid summer. The egg shell has not been found at the spring mine, suggesting that this species hibernates in a younger larval instar after feeding in the preceding summer or autumn. The mine extends straight towards the base of the leaf. It is translucent, at first yellowish and thread-like, widening and becoming whitish gradually, often eventually occupying the half width of the blade, but rarely extending beyond the midrib. The larva sometimes forms more than one mine. Excrements are crammed into the early mine behind the active larva. Pupation takes place mainly in the angle on the upper side of a food leaf. The pupa is exposed, and is attached to the leaf by a single girdle and the cremaster.

In central and northern Hokkaidô, larval feeding is observed most frequently in June, and the adult flies in July and early August. This species is probably univoltine.

Remarks. Traugott-Olsen (1994) points out that the figure shown as the adult female of *E. utoonella* in Traugott-Olsen and Nielsen (1977) is in reality that of *E. juliensis* Frey female, and gives the figure of the genuine *E. utoonella* female.

Specimens examined. Most specimens were collected at larval stage in the field in Hokkaidô and were reared to adults; the rearing numbers are given in parentheses after the foodplants. Unless otherwise stated the specimens were collected by me. [Japan; Hokkaidô]: 2 ♂ 3 ♀, Hûren-ko, Nemuro-si, em. 9–11. vii. 1995, *ex Carex lyngbyei* (00114, 00114'); 1 ♂, Nisima-rubetu, Betukai-tyô, em. 12. vii. 1995, *ex C. lyngbyei* (00117); 1 ♂, Ninisibetu, Akan-tyô, em. 12. vii. 1995, *ex Carex* sp. (00243); 2 ♂, Kunneppu-tyô, em. 21. vi. 1994, *ex Carex* sp. (IW-80), A. Iwasaki leg.; 2 ♂, Sakanosita-kaigan, Wakkanai-si, em. 19–30. vi. 1994, *ex C. lyngbyei* (00041); 1 ♂ 3 ♀, Minami-sakanosita, Wakkanai-si, em. 30. vi–4. vii. 1995, *ex C. pumila* (00104); 4 ♂ 8 ♀, Higasi-sarobetu, Toyotomi-ty, em. 19. vi–1. vii. 1994, *ex C. thunbergii* (00045); 1 ♂ 4 ♀, *ditto*, em. 4–6. vii. 1995, *ex C. lyngbyei* (00097); 2 ♂ 5 ♀, *ditto*, em. 20. vi–3. vii. 1995, *ex C. thunbergii* (00098); 6 ♂ 2 ♀, Sakkuru, Otoineppu-mura, em. 25–30. vi. 1994, *ex C. sadoensis* (00050) and *Scirpus wichurae* (1 ♂, 00047); 4 ♂ 3 ♀, *ditto*, em. 21. vi–9. vii. 1995, *ex C. dispalata* (1 ♂ 1 ♀, 00107), *C. rhynchophylla* (2 ♂, 00107), *C. sadoensis* (1 ♂ 3 ♀, 00107), and *S. wichurae* (1 ♀, 00107); 4 ♂, Uryû-numa, Uryû-tyô, 6.



viii. 1957, T. Kumata leg.; 3 ♂ 2 ♀, Isikari-hama, Isikari-tyô, em. 4. vii-2. viii. 1993, ex *C. dimorpholepis*, Y. Sakamaki leg.; 10 ♂ 7 ♀, *ditto*, em. 25. vi-14. vii. 1994, ex *C. dimorpholepis* (00051); 1 ♂ 2 ♀, Sapporo-si, em. 28. vi-5. vii. 1967, ex *Carex* sp. (849), T. Kumata leg.

***Elachista bipunctella* (Sinev and Sruoga) (Figs 5, 13)**

*Biselachista bipunctella* Sinev et Sruoga, 1995, *Ent. Obozr.* **74**: 137; Sinev and Sruoga, 1997, in Ler, *Key Insects Russian Far East* **5** (1): 501.

*Elachista bipunctella*: Kaila, 1999, *Syst. Ent.* **24**: 167.

**Redescription.** The description described below is based on a single male specimen, with the wings not spread.

**Male (Fig. 5).** Forewing length 3.7 mm.

Head white. Labial palpus white, with the second segment greyish or brownish below. Scape white, suffused with ochreous scales above. Flagellum ochreous grey, raised in distal part, with short hairs scattered. Thorax and tegulae white. Fore and mid legs greyish or brownish. Hind leg white or slightly tinged with ochre, with tibial spurs sometimes greyish outwards.

Forewing white, margined with brownish grey on basal 2/3 of costa, with two quite small dark brown marks around the middle of the fold and around the tip of the cell; coppery brown scales scattered sparsely on distal 1/4 of wing and rather densely around two dark

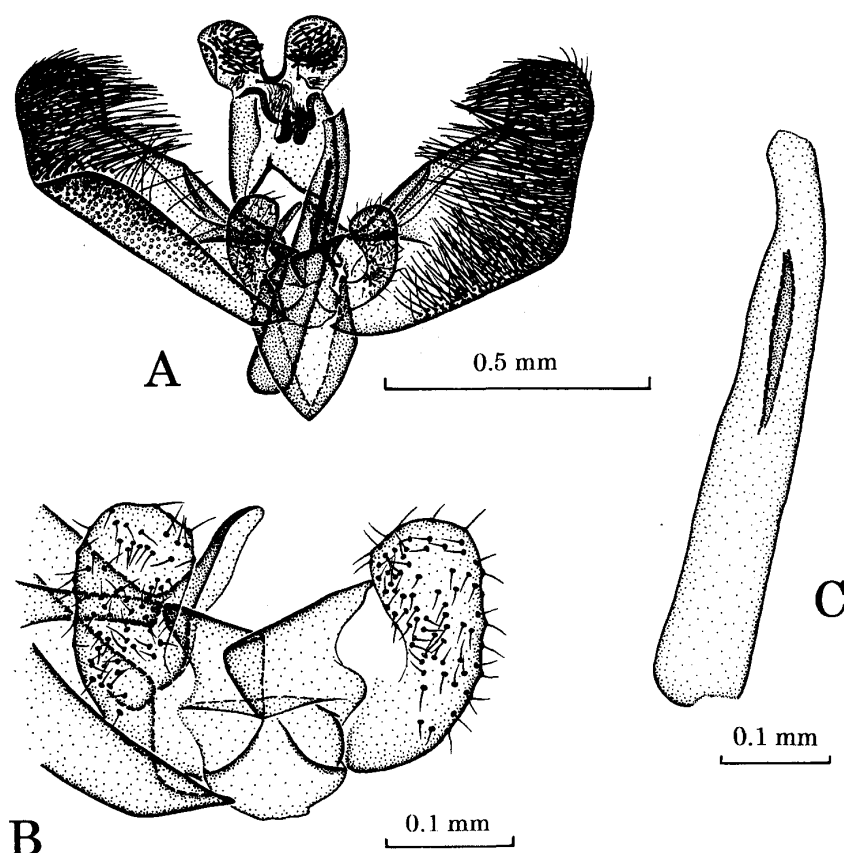


Fig. 13. Male genitalia of *Elachista bipunctella* (Sinev & Sruoga). A: caudal view, with valva expanded, B: juxta and digitate process, C: aedeagus (slide no. 0336, K. Sugisima).

brown marks mentioned above. Hind wing ochreous grey, with light greyish cilia.

Male genitalia (Fig. 13). Very similar to those of *E. utionella* in essential structure, but the following differences are observed: uncus lobe with about 50 spatulate setae; tegumen more elongate; valva distinctly broader, gradually widening from the base (1/3 of the valva length) towards basal 3/5 (widest, 2/5 of the valva length), with the corner around basal 3/5 of the ventral margin much more distinct (about 120°); cucullus occupying the apical 1/7 of the valva.

Distribution. The specimen was collected in Tomakomai-si, 50 km South of Sapporo-si. Outside Japan, the species was recorded only from southern Primorskiy, Russian Far East (Sinev and Sruoga, 1995).

Foodplants. Unknown.

Biology. This species is probably univoltine and likely to occur in boggy places in early or mid summer both in Japan and in southern Primorskiy where type material was collected (Sinev and Sruoga, 1995).

Specimen examined. [Japan; Hokkaidō]: 1 ♂, Tokisatamappu, Tomakomai-si, 4. vii. 1984, T. Kumata leg.

Remarks. Just recently Kaila (1999) transferred this species to *Elachista*.

### ***Elachista albidella*** Nylander (Figs 6, 7, 14, 15)

*Elachista albidella* Nylander, 1848, in Tengström, *Notis. Sällsk. Faun. Fl. fenn. Förh.* 1 (1847): 150; Kaila, 1996, *Entomologica scand.* 27: 227–230; Parenti, 1996, *Lepid. Europe. Distrib. Checklist*: 68; Kaila, 1999, *Syst. Ent.* 24: 166.

*Biselachista albidella*: Traugott-Olsen and Nielsen, 1977, *Fauna entomologica scand.* 6: 267.

*Apheloseia rhynchospora* Stainton, 1848, *Zoologist* 6: 2165.

*Poeciloptilia uliginosella* Herrich-Schäffer, 1855, *Syst. Bearbeitung Schmiett. Eur.* 5: 310.

*Elachista tanyopsis* Meyrick, 1932, *Exotic Microlepid.* 4: 218.

Redescription. Male (Fig. 6) and female (Fig. 7). Forewing length ♂ 3.7–4.0 mm, ♀ 3.7–4.3 mm; wing expanse ♂ 8.0–8.2 mm, ♀ 8.0–9.2 mm.

Head and neck tuft white, with frontoclypeus and proboscis of male greyish. Scape dark brownish above, whitish below. Flagellum dark brownish, raised in distal part in male. Labial palpus white, dark brownish outwards and below on the second segment, and often mottled with dark brownish scales on the third segment in various ways. Thorax and tegula white, darkened in cephalic part of tegula. Fore and mid legs dark greyish. Hind leg dark greyish above and ochreous below in male, uniformly ochreous in tibia and tarsus in female; tibia with beige hairs above and ochreous hairs below in male, with pale ochreous hairs above and below in female. Abdomen brownish grey in male, pale ochreous grey in female; anal tuft paler.

Forewing white, sometimes slightly tinged with ochre, edged with dark grey on basal 1/2 or 2/3 of costa, and suffused with coppery scales on costa, near the base around the fold slightly, on dorsum before tornus, and on distal 2/5 of the wing strongly; dark brownish scales sparsely scattered along termen and on distal part of dorsum; just before 3/4 of costa and around the apex white spots present, often fused with each other; another white spot around tornus, almost opposite to the costal one, and separated from the other two spots by a marking of coppery scales obliquely running from basal 2/3 of costa towards termen; an



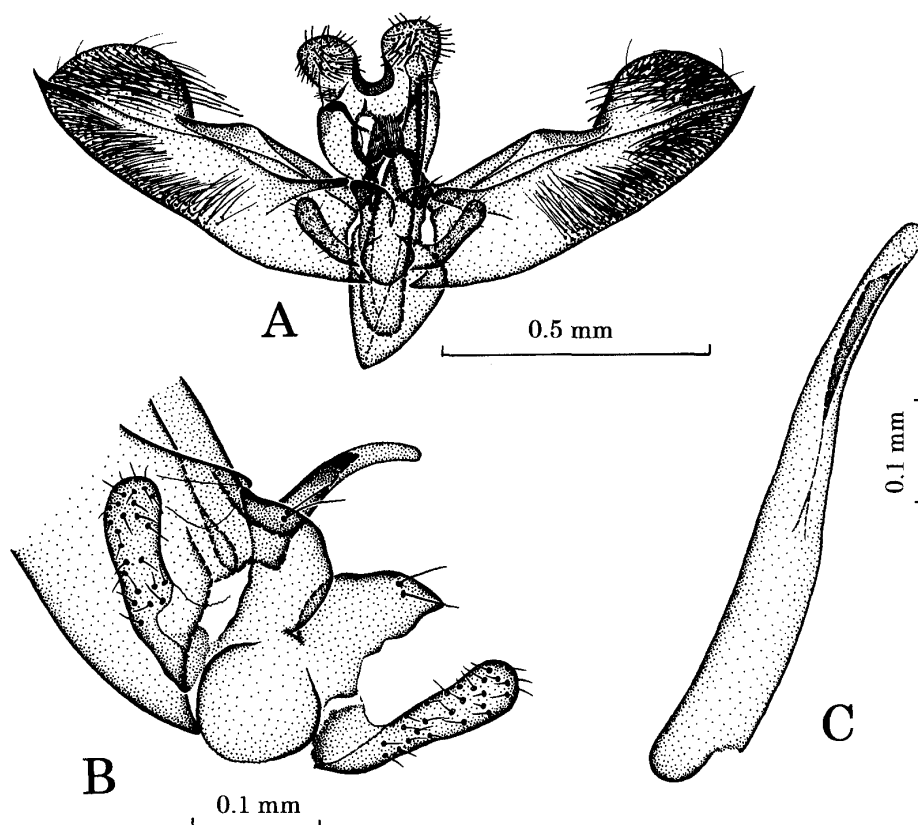


Fig. 14. Male genitalia of *Elachista albidella* Nylander. A: caudal view, with valva expanded (slide no. 0473, K. Sugisima), B: juxta and digitate process (slide no. 0473, K. Sugisima), C: aedeagus (slide no. 0475, K. Sugisima).

elongate dark brownish mark around the middle of the fold, bordered outwards with a whitish spot; a dark brownish streak crossing the oblique coppery marking around the tip of the cell, various in length and in distinctness; cilia creamy, with dark brownish cilia line somewhat indistinct; the darker markings mentioned above are weaker in female than in male. Hind wing and its cilia greyish, somewhat paler on the apex.

Male genitalia (Fig. 14). Uncus lobe almost quadrate, with 30–40 slender setae; indentation between the lobes deep, U-shaped, and strongly sclerotized in cephalic part. Tegumen almost as long as wide. Gnathos distally divided into a pair of small knobs; arms short. Valva becoming slightly wider from the base to basal 2/5, tapering towards large semicircular cucullus; costal margin strongly bent around basal 2/5, at the widest point of valva; sacculus easily distinguishable from cucullus by a well-developed suture, tapering into a prominent thorn. Digitate process somewhat clavate, with short setae scattered. Juxta lobes separated from each other by a narrow U-shaped cleavage; anterior part round, bluntly produced at the apex, medially with two setae. Vinculum moderately sclerotized. Aedeagus slightly sigmoid, tapering towards the apex, shorter than valva, with cornutus represented by an elongate sclerotized plate 1/4 as long as aedeagus.

Female genitalia (Fig. 15). Papilla analis bluntly triangular in lateral view, apically with two stout bristles, and basally with two distinctly longer setae; some setae on the ventral side thicker than the others. Apophyses almost equal in length with each other and with the papilla analis. Antrum cup-shaped, shorter than papilla analis. Colliculum as long as or

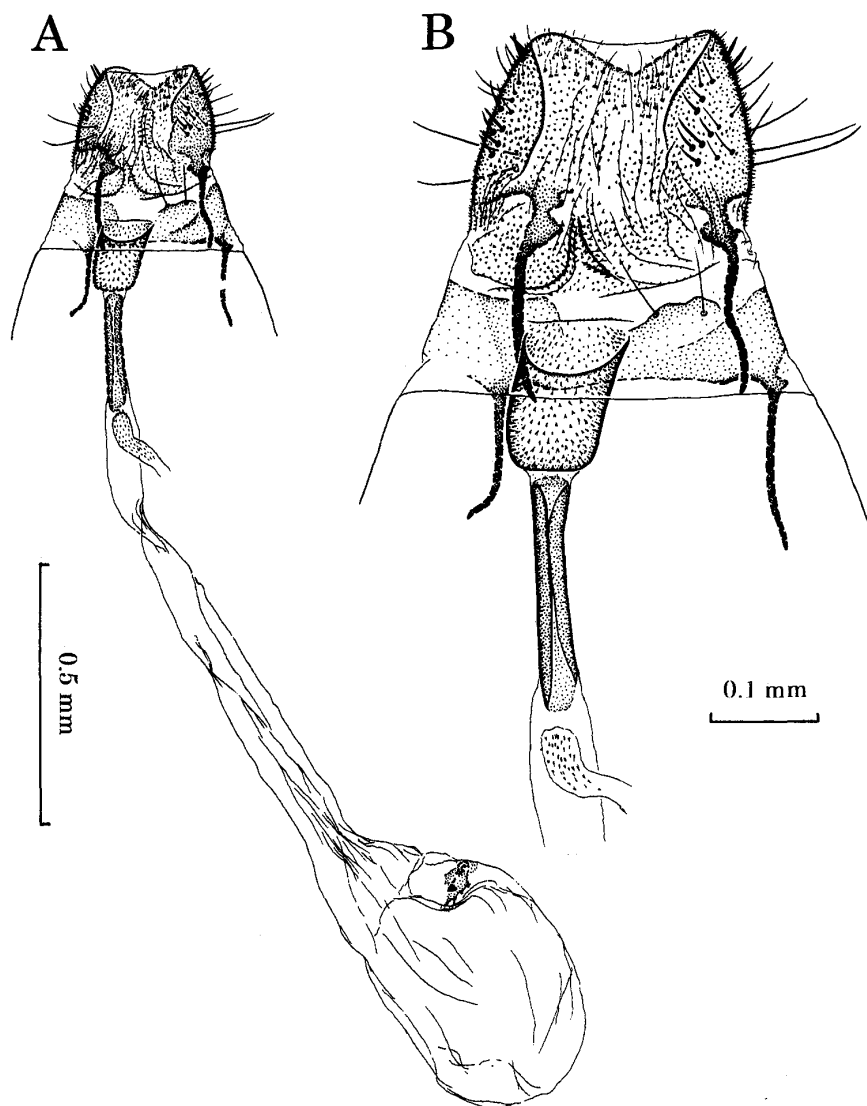


Fig. 15. Female genitalia of *Elachista albidella* Nylander. A: ventral view, B: caudal part (slide no. 0474, K. Sugisima).

slightly longer than one and half length of antrum, separated from antrum by a short membranous part. Ductus seminalis branching off just cephalically to colliculum. Signum represented by a small sclerotized patch with a transverse dentate ridge, which has less than ten teeth in each end and is very often reduced considerably.

**Distribution.** Holarctic: North America, Europe and Japan (Honsyû). This well-known species is rather common in almost all parts of Europe (*e. g.* Traugott-Olsen and Nielsen, 1977). Recently, *E. tanyopis* occurring in North America was synonymized with *E. albidella* by Kaila (1996).

**Foodplants.** *Eriophorum vaginatum* L. in Japan. Some other Cyperaceae (*Carex acuta* L., *Carex acutiformis* Ehrh., *Eleocharis palustris* (L.), *Scirpus caespitosus* L., etc.) and Poaceae (*Calamagrostis arundinacea* (L.), *Deschampsia caespitosa* (L.), *D. flexuosa* (L.), *Melica nutans* L., *Poa palustris* L.) are also recorded in Europe (Parenti and Varalda, 1994).

**Biology.** In sphagnum wetlands in Minamihakkôda, northern Honsyû, larval feeding comes

almost to an end in late June. The egg shell was not found at the start of the mine, suggesting that this species hibernates in a younger instar larva after feeding in the preceding summer or autumn. The mine extends straight from around the tip of the leaf towards the root. It is greyish white, translucent, at first thread-like, widening gradually, and eventually occupies the whole width of the blade, with the excrement lying in the earlier part of the mine. In rearing condition, pupation took place mainly on the angle of a rearing cage, in a very fragile cocoon composed of a few silk filaments, and thus the pupa was supported by the cremaster and a silk girdle; the pupal stage took less than ten days. This species is probably univoltine.

**Remarks.** North American *E. tanyopsis* had been regarded as a distinct species that was very closely related to the European *E. albidella* (e. g. Braun, 1948: she used *E. rhynchosporella* instead of *E. albidella*). Traugott-Olsen and Nielsen (1977) mentioned that *tanyopsis* may be conspecific with *albidella*. Recently Kaila (1996) synonymized *tanyopsis* with *albidella* on the examination of a good quantity of both North American and European specimens.

**Specimens examined.** [Japan; Honsyû]: 3 ♂ 2 ♀, Ôse-yati, Minamihakkôda, Aomori-ken, col. 22. vi. 1998, em. 3-4. vii. 1998, S. Yamauchi and K. Sugisima leg., ex *Eriophorum vaginatum* (00302). [Austria]: 1 ♂ 1 ♀, sup. Sandl., Rosenhof Moor, 19. vii. 1964, J. Klimesch leg., ex *Eriophorum vaginatum*.

***Elachista kobomugi* sp. nov.** (Figs 8-10, 16, 17)

**Diagnosis.** A white, medium-sized species, with hind tarsus and abdomen always whitish. The species is no doubt littoral and apparently associated with *Carex kobomugi* and *C. macrocephala*, which grow on sandy beaches. It is well characterized by the large and spatulate valva, with the apical margin parabola-shaped, and by the deep-cup-shaped antrum nearly as long as the colliculum, which is rather short.

**Description.** Male (Figs 8, 9) and female (Fig. 10). Forewing length ♂ 3.5-4.2 mm, ♀ 3.8-4.6 mm; wing expanse ♂ 7.8-9.5 mm, ♀ 8.5-10.6 mm.

Head and neck tuft white. Scape white, sometimes coppery above. Flagellum coppery or rarely dark brownish, somewhat raised in distal part in male. Labial palpus white, with the second segment dark brownish towards the base at outside. Thorax and tegulae white. Fore and mid legs coppery or dark greyish. Hind leg white or creamy; tibial spurs and tarsus sometimes slightly darkened above. Abdomen creamy.

Forewing white, with costal margin greyish or brownish in basal 1/2 or 3/4, darker towards the base; an elongate blackish brown mark of somewhat raised scales present on basal 2/3 of fold, often indistinct, and rarely larger than the other distinct blackish brown mark around the tip of the cell; coppery scales scattered, usually sparsely but sometimes densely, on distal area of the wing, especially around the blackish brown marks mentioned above and along termen; in some specimens which are densely patterned with coppery scales, whitish spots indistinctly recognisable at basal 3/4 of costa, around tornus and near the apex; cilia white, with cilia line blackish brown; the coppery scales generally fewer in female than in male. Hind wing ochreous grey; cilia greyish on costa, whitish on dorsum.

Male genitalia (Fig. 16). Uncus lobe almost quadrate, with the outer margin somewhat convex, and with about 40 weakly spatulate setae; indentation between the lobes rather wide U-shaped, strongly sclerotized in cephalic part. Tegumen as long as wide, almost parallel-sided. Gnathos distally divided into a pair of small spined knobs by a shallow cleavage;

arms short. Valva large, widening from the base (narrowest,  $1/4$  of the valva length) towards a little beyond the middle (widest,  $1/3$  of the valva length), with the costal margin bent just before the cucullus, and with the ventral margin smoothly curved; cucullus large, nearly semi-elliptical,  $1/3$  as long as valva; suture between cucullus and sacculus distinct basally, becoming weaker distally. Digitate process thick, clavate, with short setae sparsely scattered. Juxta lobes separated from each other by a U-shaped indentation, almost quadrate, strongly sclerotized along the outer margin, with the inner apical corner rather round and the outer apical corner rather acute, and without setae. Vinculum moderately sclerotized. Aedeagus rather thick,  $2/3$  as long as valva, tapering towards the apex, weakly bent around distal  $1/3$ , with cornutus represented by an elongate sclerotized plate  $1/3$  as long as aedeagus.

Female genitalia (Fig. 17). Papilla analis bluntly triangular in lateral view, with two stout bristles near the caudal end, and with two distinctly longer setae basally; some setae near the ventral margin often thicker than the others. Apophysis anterioris 1 to 1.3 times as long as papilla analis, slightly shorter than apophysis posterioris. Antrum cup-shaped, slightly shorter than papilla analis. Colliculum almost as long as the antrum, separated from antrum by a short membranous part. Ductus seminalis branching off cephalically to colliculum; ductus bursae with a group of quite fine spines and a very weakly sclerotized patch near insertion point of the ductus seminalis. Signum represented by a small sclerotized patch with a transverse dentate ridge, which has less than ten teeth in each end and is sometimes reduced

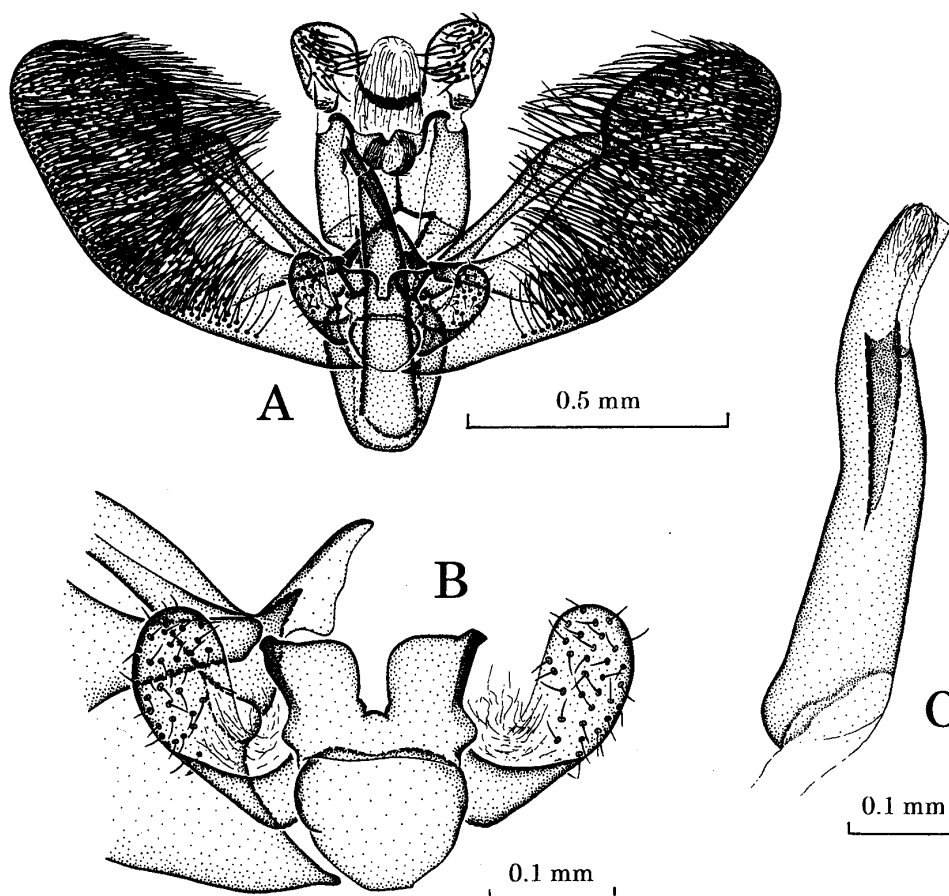


Fig. 16. Male genitalia of *Elachista kobomugi* sp. nov. A: caudal view, with valva expanded (holotype, slide no. 0130, K. Sugisima), B: juxta and digitate process (holotype, slide no. 0130, K. Sugisima), C: aedeagus (paratype, slide no. 0348, K. Sugisima).

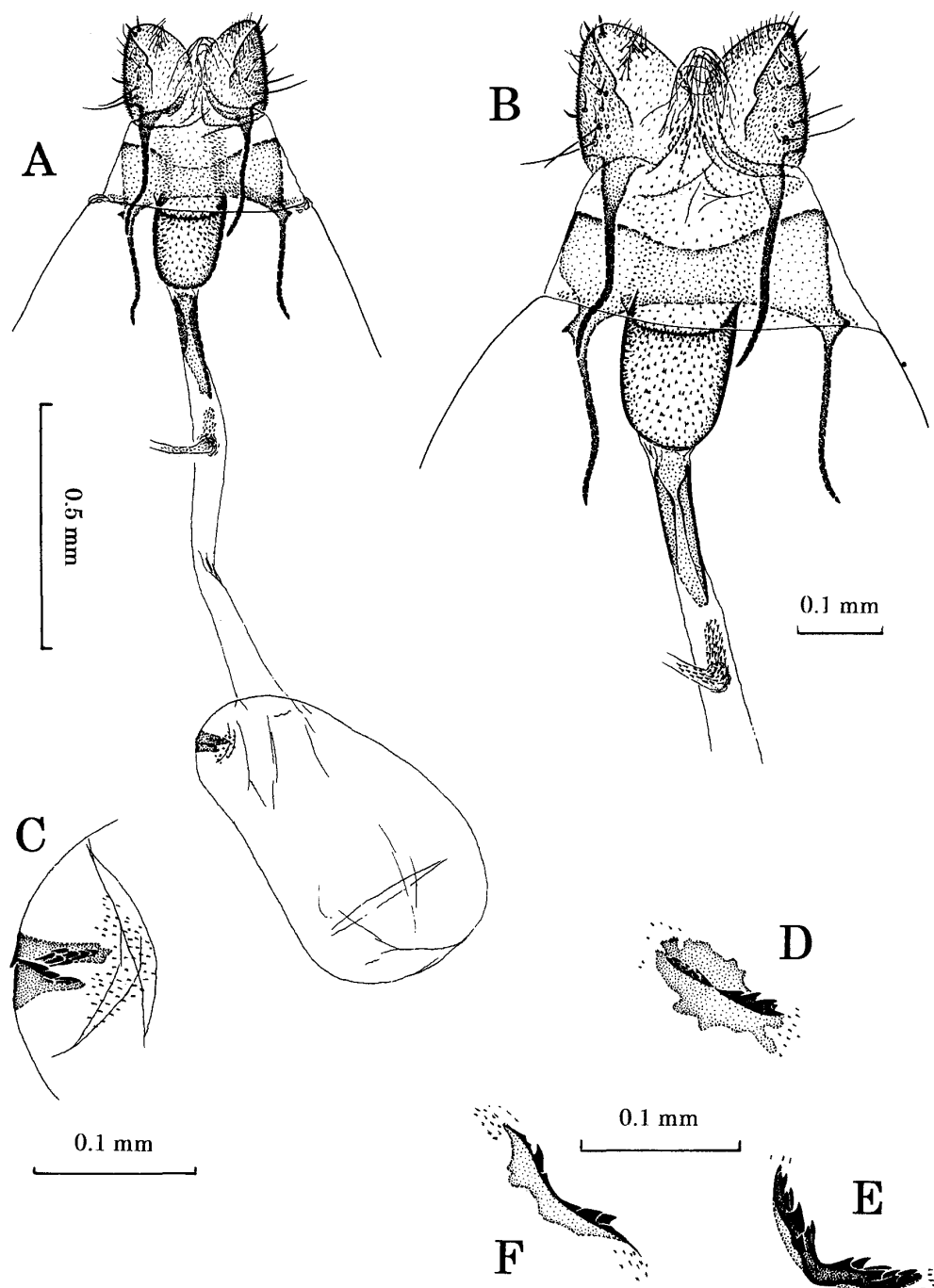


Fig. 17. Female genitalia of *Elachista kobomugi* sp. nov. A: ventral view (paratype, slide no. 0131, K. Sugisima), B: caudal part (paratype, slide no. 0131, K. Sugisima), C: signum (paratype, slide no. 0131, K. Sugisima), D: *ditto* (paratype, slide no. 0123, K. Sugisima), E: signum (paratype, slide no. 0164, K. Sugisima), F: signum (paratype, slide no. 0198, K. Sugisima).

considerably.

Distribution. Japan (Hokkaidô, Honsyû).

Foodplants. Four species of sedges occurring on sandy beaches, *Carex kobomugi* Ohwi, *C. macrocephala* Willd., *C. pumila* Thunb. and *C. microtricha* Franch. are recorded as food-

plants. It is, however, highly probable that the first two species are principal foodplants, because the moths have not been found at any place without them even if the others are dominant there.

**Biology.** This species shows an extreme preference for sandy beaches just beside the sea. The larva is a leaf miner, and larval feeding has been observed only in spring and early summer. The egg shell has not been found at the start of the spring mine, suggesting that this species hibernates in a young larval instar after feeding in the preceding summer or autumn. The mine starts from a hole on a distal part of the leaf, extends usually straight towards the base, becomes wider gradually and eventually occupies the half width of the blade, with the excrement lying in the earlier part of the mine. The larva eats the whole leaf tissue and makes the yellowish or whitish mine translucent. It sometimes makes new mines. The larva is yellowish in younger instars and turns into whitish or pale ochreous as it develops, with the head and the prothoracic shields brownish. Pupation takes place in a rather fragile cocoon composed of a few silk filaments. The pupa is supported by the cremaster and a silk girdle, light brown, slender, teardrop-shaped in dorsal view, with the dorsal and spiracular ridges prominent. In the field, the pupa is sometimes found on the upper side of a food leaf near the base. In rearing conditions, the pupal stage took about ten days. The adult is often found resting on the foodleaf in early or mid summer. This species is probably univoltine.

**Remarks.** *E. margareteae* (Traugott-Olsen), which was discovered from the coast of Toscana, Italy, and described on the basis of the male alone, is very similar to *E. kobomugi* in the general appearance and genitalia of the male, and likely to be the closest relative of the new species. These two species are separated as follows: the apical part of the valva is parabola-shaped and the juxta lobe has no setae in *E. kobomugi*, while in *E. margareteae* the valva is somewhat quadrate in the apical part and each juxta lobe has two setae.

*E. bipunctella* and extremely whitened forms of *E. utonella* and *E. albidella* are superficially quite similar to this species, but may be separated by their male abdomens being seldom whitish.

Some elachistid species, whether phylogenetically closely-related or not, are whitish in coloration and very similar to *E. kobomugi*. Examination of the genitalia is indispensable for reliable identification.

**Specimens examined.** All specimens were collected by me and are deposited in the collection of Laboratory of Systematic Entomology, Faculty of Agriculture, Hokkaido University (SEHU). For paratypes, the rearing numbers are given in parentheses after the foodplants. **Holotype.** ♂, Tottori-sakyu, Tottori-si, Honsyû, Japan, em. 15. v. 1995, Host 00062, leaf miner on *Carex kobomugi*, col. 26. iv. 1995, genitalia slide no. 0130 (K. Sugisima, 1996). **Paratypes.** Hokkaidô: 1 ♀, Minamisakanosita, Wakkanai-si, em. 1. vii. 1995, ex *C. pumila* (00104); 8 ♂ 2 ♀, Toyosato-kaigan, Toyotomi-tyô, em. 21. vi-1. vii. 1995, ex *C. macrocephala* (00100); 8 ♂ 4 ♀, Hideura, Obira-tyô, em. 19-30. vi. 1994, ex *C. macrocephala* (00040); 9 ♂ 3 ♀, ditto, em. 25-30. vi. 1994, ex *C. pumila* (00039); 2 ♂ 1 ♀, ditto, 16. vii. 1995; 10 ♂ 5 ♀, Isikari-hama, Isikari-tyô, em. 13-25. vi. 1994, ex *C. kobomugi* (00029); 4 ♂ 1 ♀, ditto, em. 21-30. vi. 1995, ex *C. microtricha* (00090); 2 ♂ 2 ♀, ditto, 7-11. vii. 1995; 2 ♂ 12 ♀, Asahi-hama, Oshamanbe-tyô, em. 21-25. vii. 1997, ex *C. kobomugi* (00249). Honsyû: 1 ♂ 2 ♀, Odanozawa, Higasi-dôri-mura, Aomori-ken, em. 15-20. vi. 1995, ex *C. kobomugi* (00081); 2 ♂ 2 ♀, Iwaya-kaigan, Higasi-dôri-mura, Aomori-ken, em. 10-22. vi. 1995, ex *C. pumila* (00079); 8 ♂ 4 ♀, ditto, em. 14-22. vi. 1995, ex *C. kobomugi* (00080); 8

♂ 7 ♀, Sunahama-kaigan, Yokohama-tyô, Aomori-tyô, em. 12–25. vi. 1995, ex *C. kobomugi* (00082); 2 ♂ 2 ♀, Syariki-kô, Syariki-mura, Aomori-ken, em. 15–20. vi. 1995, ex *C. kobomugi* (00083); 4 ♂ 2 ♀, *ditto*, em. 13–25. vi. 1995, ex *C. pumila* (00084); 3 ♂ 1 ♀, Zyôge-hama, Kakizaki-tyô, Niigata-ken, 15. v. 1995; 3 ♂ 1 ♀, Hamakurosaki, Toyama-si, 15. v. 1995; 14 ♂ 14 ♀, Tottori-sakyû, Tottori-si, em. 9–26. v. 1995, ex *C. kobomugi* (00062). Whole body on slide: ♂, Tottori-sakyû, Tottori-si, Honsy, em. 19. v. 1995, ex *C. kobomugi* (00062), slide no. 0196 (K. Sugisima); ♂, Isikari-hama, Isikari-tyô, Hokkaidô, 11. vii. 1995, slide no. 0197 (K. Sugisima); ♀, *ditto*, em. 25. vi. 1994, ex *C. kobomugi* (00029), slide no. 0198 (K. Sugisima).

### Discrimination between the four species treated in this paper

In the external coloration, most of *E. utonella* are distinguished from the others by their ochreous or brownish forewings, but the variations of these four species overlap in both sexes. As to the females, *E. kobomugi* is separated from *E. utonella* and *E. albidella* by the colliculum being not longer than the antrum, and the ratio of the length of the apophysis posterioris to the apophysis anterioris divides *E. utonella* and *E. albidella* incompletely (1–1.6 : 1 in *E. utonella*, 1 : 1 in *E. albidella*). The females of *E. bipunctella* are not examined here.

These four species in this paper can be separated from one another reliably only on examination of the male genitalia. Thus a key is given only to the males based on the genitalia.

1. Valva with a bend in the ventral margin .....2
- . Valva without such a bend in the ventral margin .....3
2. The bend obtuse (over 145°) .....*E. utonella* Frey
- . The bend rather distinct (about 120°) .....*E. bipunctella* (Sinev and Sruoga)
3. Valva apically with a distinct spine .....*E. albidella* Nylander
- . The apical margin of valva parabola-shaped, without such a spine  
.....*E. kobomugi* sp. nov.

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## 摘 要

*Elachista* 属の海浜性の新種 *Elachista kobomugi* sp. nov. およびその日本産近縁種 (鱗翅目, クサモグリガ科) (杉島一広)

極東地方大陸部のクサモグリガ科相はここ 10 年以内に精力的に調査され, 例えば現在極東ロシアからは 47 種のクサモグリガ科が記録されているのに対し, 日本からは, Kuroko (1982) および Parenti (1983) によって計 15 種が知られているにすぎない. しかも, 北日本のクサモグリガ科に関する知見は皆無に等しい. 今回私が北日本産クサモグリガ科標本を検討したところ, Kaila (1996) が設定した *Elachista tetragonella* 種群に属する海浜性の 1 新種とそれに非常に近縁な日本新記録種 3 種が見いだされた. それぞれの特徴は以下のとおりである.

*Elachista utionella* Frey (Figs 1–4, 11, 12) ヤチチャマダラクサモグリガ (新称)

道南を除く北海道各地から得られている. 多くの個体では前翅は褐色で, 前縁の 3/4 弱付近, 後角付近, 翅端付近および折り目上に乳白色の紋を持ち, 前縁の乳白色紋の内側と折り目中央には黒褐色斑を持つ (Figs 1, 2). しかし, 時として極端に淡色化した個体も見られる (Figs 3, 4). 体色の濃淡における個体変異が極めて大きいため, 外観による本種の確認は時に困難. 本種は♂ならば交尾器 (Fig. 11) の valva の形状によって容易に識別される. ♀では交尾器 (Fig. 12) の papilla analis と apophyses の相対長や antrum の形状により確認されることが多い. 年 1 化らしく, 日本では初夏にスゲ属 (*Carex* spp.) とアブラガヤ (*Scirpus wichurae*) の葉から幼虫が得られている.

ヨーロッパ各地に広く分布し (Traugott-Olsen and Nielsen, 1997), 最近沿海州南部 (ロシア) から記録された (Sruoga, 1995). 前述のカヤツリグサ科植物のほかにイグサ科のイグサ属 (*Juncus gerardi*) およびイネ科のウシノケグサ属 (*Festuca* sp.) も食草として報告されている (Parenti and Varalda, 1994).

*Elachista bipunctella* (Sinev and Sruoga) (Figs 5, 13) フタテンシロクサモグリガ (新称)

苫小牧市東部の湿地から 1 ♂のみ得られた. 前翅の折り目中央と中室末端付近の黒褐色斑等を除いて全身ほぼ一様に白色. 本種は♂交尾器 (Fig. 13) の形状から判断して前述のヤチチャマダラクサモグリガにもっとも近縁と考えられるが, valva 腹側の縁がより明瞭に屈曲し, おおよそ 120° をなす事により区別される.

最近沿海州南部 (ロシア) から記載された種で (Sinev and Sruoga, 1995), 幼虫の食草は不明. 年 1 化らしい.

*Elachsita albidella* Nylander (Figs 6, 7, 14, 15) シロクサモグリガ (新称)

南八甲田の高層湿原から得られた. 前翅の地色は白色で, 銅褐色の鱗片が特に先端側半分に散在し, 折り目中央と中室末端付近には黒褐色斑が現れる (Figs 5, 6). 本種は♂ならば交尾器 (Fig. 14) の valva の形状によって容易に識別される. ♀では交尾器 (Fig. 15) の papilla analis と apophyses の相対長や antrum の形状により識別できることが多い. 年 1 化らしく, 日本ではカヤツリグサ科のワタスゲ (*Eriophorum vaginatum*) の葉から幼虫が得られている.

ヨーロッパではよく知られた種で, ワタスゲのほかに同じくカヤツリグサ科のスゲ属 (*Carex* spp.), ハリイ属 (*Eleocharis palustris*), ホタルイ属 (*Scirpus caespitosus*) およびイネ科のノガリヤス属 (*Calamagrostis arundinacea*), コメススキ属 (*Deschampsia* spp.), コメガヤ属 (*Melica nutans*), ナガハグサ属 (*Poa palustris*) も食草として報告されている (Parenti and Varalda, 1994).

*Elachsita kobomugi* sp. nov. (Figs 8-10, 16, 17) コウボウムギクサモグリガ (新称)

鳥取県から北海道の主に日本海側の海岸から得られた. 全身一様に白色で, 前翅は折り目中央と中室末端付近に黒褐色斑を持ち, また先端側に銅褐色の鱗片が散在する (Figs 8-10). 本種の色彩斑紋は上述の 3 種に酷似し, 交尾器の検討によってのみ確実に識別される. ♂では valva の形状 (Fig. 16), ♀では colliculum と antrum の相対長 (Fig. 17) が特に有効である. ただし, ♂であれば腹部まで白色化することによって類似した種からある程度区別される. 年 1 化らしく, 幼虫は春から初夏にかけてコウボウムギ (*Carex kobomugi*), エゾノコウボウムギ (*C. macrocephala*), 時にコウボウシバ (*C. pumila*) やチャシバスゲ (*C. microtricha*) の葉から得られている.

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